Pacific Science (1985), vol. 39, no. 2

Polychaetes from Fijian Coral Reefs[1]

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ABSTRACT: Nineteen polychaete species belonging to five families, and representatives of two others not identified to species, are recorded from Viti Levu, Fiji. Most of the calcareous tubeworms (Serpulidae, Spirorbidae) were collected from shallow patch reefs in the Mba Passage off the northwest coast; the remaining worms came from the intertidal region of Suva Harbor on the southeast coast of Viti Levu. The tubeworms *Spirobranchus giganteus corniculatus* and *Floriprotis sabiuraensis* were collected with live coral, and 12 species were scraped from coral rock. Extensive patches of a gregarious sabellariid occur in Suva Harbor, and nereidids and spionids were found among the densely packed sabellariid tubes. Polychaetes in this collection are most similar to faunas of eastern Australia, Japan, Hawaii, and Tonga, and least similar to those of the Societies, Marquesas, and Tuamotus. These faunal affinities show a west to east trend reflecting Ekman's rule, but could also be explained on the basis of sampling effort.

A NEED CLEARLY EXISTS for taxonomic and ecological studies on polychaetes of Pacific coral reefs, as indicated by Fauchald (1976). Information on polychaetes from Micronesia is conspicuously lacking, and there is only a partial picture of the diversity and importance of polychaetes in Pacific coral reef ecosystems.

In the northern hemisphere, polychaetes of the Hawaiian and Marshall islands have been studied thoroughly, with 205 and 70 species recorded, respectively (Bailey-Brock and Hartman 1985, Devaney and Bailey-Brock 1985, Hartman 1954). In the southern hemisphere, 237 species of polychaetes are known from New Caledonia (Fauvel 1930, 1947; Rullier 1972); 220 species from the Solomon Islands (Gibbs 1971); 29 species from Samoa (Treadwell 1922, 1926); 38 species from the Cook Islands (Gibbs 1972); and about 74 species from Tahiti, the Tuamotus, and Marquesas (Fauvel 1919; Monro 1928, 1939*a*,*b*).

The rising of the edible palolo worm has been described on a number of occasions from Fiji (Miller and Pen 1959), and Treadwell collected 21 species from the reefs and mud flats at Suva and in Suva Harbor (Treadwell 1921, 1922, 1926), but apart from these records, Fijian polychaetes are not well known.

The 23 species recorded here belong to 7 families and 18 genera. Most of the specimens are deposited at the Bernice P. Bishop Museum, Honolulu (BPBM), except for the polynoids and some duplicate specimens, which are at the U.S. National Museum, Smithsonian Institution (USNM).

SAMPLING LOCATIONS

Most of the polychaetes were collected 19–22 June 1980 on the tops and sides of patch reefs in Bligh Water, approximately 15–20 km from the Mba estuary on the northwest coast of Viti Levu (Figure 1). Eight species were obtained from the shallow fringing reef near Suva Harbor on the southeast coast of Viti Levu. Collection locations for each species are given in Table 1.

Habitats

Suva Harbor: The shoreline at Suva has been extensively altered with walling, backfilling, and point drainage sources. The area is polluted with nondegradable materials from

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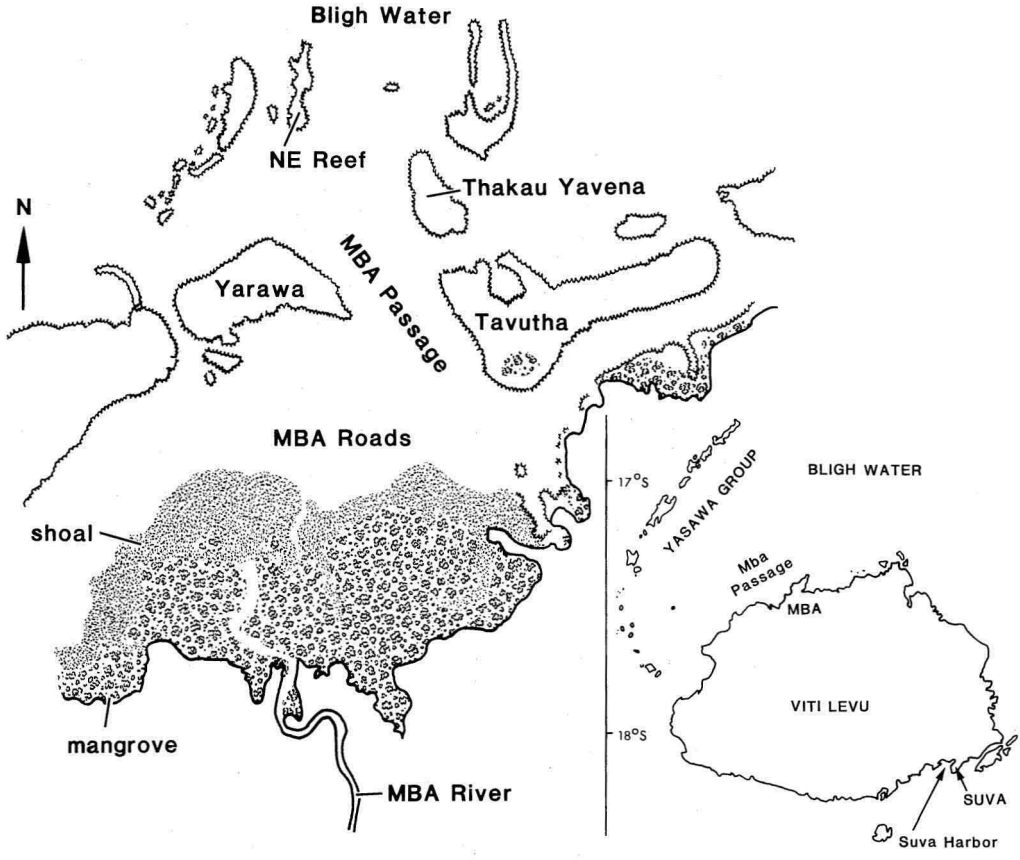

FIGURE 1. Inset map of Viti Levu, Fiji, showing collecting sites at Suva Harbor and in the Mba Passage. Main map shows patch reefs in the Mba Passage north of the Mba River.

the nearby town and markets. The intertidal fringing reef near Suva Habor is a mud flat characterized by black, organic muds and basalt boulders, and is devoid of mangroves and thalloid algae. The sabellariid worm, *Sabellaria* sp., is dominant on the reef flat, occurring as masses of cemented tubes of muddy sand that encrust boulders and form reeflike developments.

Patch Reefs in Bligh Water: Extensive patch reef systems extend 15–20 km north of the Mba estuary and lie to the southeast of the Yasawa group. The two reefs sampled are Thakau Yavena and Northwest Reef, a reef at the northern end of the Mba Passage directly northeast of Thakau Yavena.

Thakau Yavena reef is about 3 km in length and 1.5 km wide and oriented north–south (Figure 1). The southern end of the reef is 15 km from the Mba delta. Northwest Reef is about 4 km seaward from Thakau Yavena reef. The Mba Passage is approximately 3.2 km wide between Thakau Yavena and Yarawa reef to the west. Collections were made from the reef flat to depths of 3–5 km.

Northwest Reef is 3 km in length and 600 km wide with a north–south orientation. Collections were made on the north and northwestern aspects of the reef from the reef flat and crest to depths of 20–30 m. The tops of these reefs are of coral rubble, sand with patches of sea grasses (*Halophila ovalis*, *Halodule pinifolia*) and algae, with living corals (*Acropora humilis*, *Porites lutea*, *Pavona decussata*, *Goniastrea pectinata*) around the perimeter extending into deeper water. Suspended

TABLE 1

POLYCHAETES COLLECTED FROM VITI LEVU, FIJI

SPECIES	LOCATION
Family Polynoidae	
Lepidonotus carinulatus (Grube 1870)	Thakau Yavena, Bligh Water
L. elongatus Marenzeller, 1902	Intertidal, Suva Harbor
Family Syllidae	
Sphaerosyllis sp.	Thakau Yavena, Bligh Water
Family Nereididae	
Perinereis nigropunctata Horst, 1889	Intertidal, Suva Harbor
Platynereis sp.	Intertidal, Suva Harbor
Nereis (*Nereis*) sp.	Intertidal, Suva Harbor
Family Spionidae	
Polydora kaneohe Ward, 1981	Intertidal, Suva Harbor
Pseudopolydora antennata (Claparède 1870)	Intertidal, Suva Harbor
Family Sabellariidae	
Sabellaria sp.	Intertidal, Suva Harbor
Family Serpulidae	
Spirobranchus giganteus corniculatus (Grube 1862)	Northwest Reef, Bligh Water
S. tetraceros (Schmarda 1861)	Thakau Yavena, Bligh Water
S. dennisdevaneyi	Thakau Yavena, Bligh Water
Semivermilia pomatostegoides (Zibrowius 1969)	Thakau Yavena, Bligh Water
Hydroides elegans (Haswell 1883)	Northwest Reef, Bligh Water
H. tuberculata Imajima, 1976	Thakau Yavena and Northwest Reef, Bligh Water
Floriprotis sabiuraensis Uchida, 1978	Northwest Reef, Bligh Water
Vermiliopsis glandigerus Gravier, 1906	North Mba Passage, Bligh Water
Family Spirorbidae	
Vinearia koehleri (Caullery and Mesnil 1897)	Northwest Reef, Bligh Water
Pileolaria militaris (Claparède 1868)	Northwest Reef, Bligh Water
Eulaeospira orientalis (Pillai 1960)	Northwest Reef, Bligh Water, and intertidal, Suva Harbor
Neodexiospira foraminosa (Moore and Bush 1904)	Thakau Yavena, Bligh Water
N. preacuta (Vine 1972*a*)	Northwest Reef, Bligh Water
Janua pagenstecheri (Quatrefages 1865)	Thakau Yavena, Bligh Water

silt is carried out of the Mba River after heavy rains and affects these offshore reefs. Up to 60 species of living corals (*Acropora*, *Montipora*, and *Favia* are the dominant genera) and 20 species of algae (many encrusting corallines and *Padina*, *Sargassum*, and *Dictyosphaeria* spp.) were seen on these reefs. Polychaetes associated with coral rubble, algae, and living coral were collected from the reef flat and sides of these extensive patch reefs.

METHODS

Polychaetes were fixed in 5% formalin and preserved in 75% ethanol. Diagnostic setae (family Serpulidae) or whole worms (family Spirorbidae) were mounted in polyvinyl lactophenol for microscopy (Knight-Jones, Knight-Jones, and Llewellyn 1974).

FAMILY POLYNOIDAE

Two species of *Lepidonotus* were collected. They share a number of features in common: The body is short, flattened, subrectangular, with 26 segments; 12 pairs of overlapping elytra on segments 2, 4, 5, 7, and on alternate segments to 23. Dorsal cirri, with cylindrical cirrophores that are swollen basally with styles extending just beyond the setae, are present on nonelytral segments. The bilobed prostomium bears three antennae, a pair of stout tapered palps, and two pairs of eyes. The tentaculophores of the first tentacular segment are lateral to the prostomium, lacking setae but with two pairs of tentacular cirri. The second segment bears the first pair of elytra, biramous parapodia, and long ventral buccal cirri similar to tentacular cirri and the

ventral mouth. Parapodia are biramous. The notopodium is shorter than the neuropodium and bears a small bundle of slender notosetae. Notosetae vary in length, some short with blunt tips, others long with fine tips; both types have close-set spinous rows. Neuropodia are stout, subconical, with fan-shaped bundles of stout neurosetae, which have slightly hooked tips and relatively few (3–7) spinous rows. Ventral cirri are short and tapered. The pygidium bears a pair of anal cirri.

Lepidonotus carinulatus (Grube 1870)

Elytra have microtubercles that are enclosed in areolate areas and a conspicuous lateral fringe of papillae. Neurosetae generally have a small secondary tooth at the tip or an indication of one. The second segment bears a pair of small nuchal lobes.

HABITAT: Among coral rubble on a coral reef in Bligh Water off Viti Levu. (One specimen, USNM 74375 ident. M. H. Pettibone.)

REMARKS: The species has been carefully illustrated by Uchida (1980).

DISTRIBUTION: Coral reefs in the Red Sea (Amoureux, Rullier, and Fishelson 1978) and Indo-West Pacific, including Japan (Uchida 1980) and the Philippines (Day 1967, Fauvel 1953).

Lepidonotus elongatus Marenzeller, 1902

Elytra have microtubercles not enclosed in areolate areas, with some slightly larger tubercles in the central part of the region of the elytrophore and a lateral fringe of short papillae. The neurosetae have entire tips. The second segment lacks nuchal lobes.

HABITAT: Among rocks and sabellariids in the intertidal region adjacent to Suva Harbor, Viti Levu. (One specimen, USNM 74376, ident. M. H. Pettibone.)

REMARKS: The species is well figured by Okuda (1936: figs. 1–2).

DISTRIBUTION: Japan, China, Samoa, East Africa (Pettibone, in literature; Imajima and Hartman 1964, Okuda 1936).

FAMILY SYLLIDAE

Sphaerosyllis sp.

An unidentified species from Bligh Water, northwest of Viti Levu.

FAMILY NEREIDIDAE

Perinereis nigropunctata Horst, 1889

Figure 2

Complete specimen with 75 segments measuring 26 mm in length, 1.75 mm in width anteriorly, 1 mm in width at the middle region (width exclusive of parapodia). Incomplete specimen with 34 segments measuring 15 mm in length and 1.9 mm in width anteriorly, middle to posterior region of 43 segments measuring 1.6 mm in width (exclusive of parapodia).

The prostomium (Figure 2*a*) is bluntly triangular, the narrow anterior margin bears a pair of short antennae, while the broad basal margin has two pairs of black eyes, the anterior pair slightly larger than the posterior pair. The peristomium is apodous, with four pairs of tentacular cirri; the most dorsal pair is the longest and extends to the fourth setiger. Paragnaths of pharynx (Figure 2*b*, *c*) are: I = group of 7 cones, II = 2–3 rows of about 16 cones, III = about 20 cones, IV = patch of about 20 cones, V = 3 in broad triangle, VI = smooth transverse bar, VII and VIII = 2–3 irregular rows of cones. Paragnaths of maxillary ring are smaller than those of the oral ring. Jaws and paragnaths are dark brown.

Anterior parapodia (Figure 2*d*) have notopodia with two equal ligules, the uppermost with a tapered dorsal cirrus; the neuropodium is formed of an acicular lobe, with neurosetae, the lower bearing a short ventral cirrus. The acicula are black. Posterior parapodia (Figure 2*e*) with the upper notopodial ligule greatly expanded, with the dorsal cirrus near the tip. Notosetae are compound homogomph spinigers (Figure 2*f*); neurosetae are homogomph and heterogomph spinigers (Figure 2*g*) and heterogomph falcigers (Figure 2*h*).

The dorsal surface of the prostomium has brown pigment emphasizing the bluntly triangular shape. The palps are brown on the anterior dorsal aspect, and the peristomium is

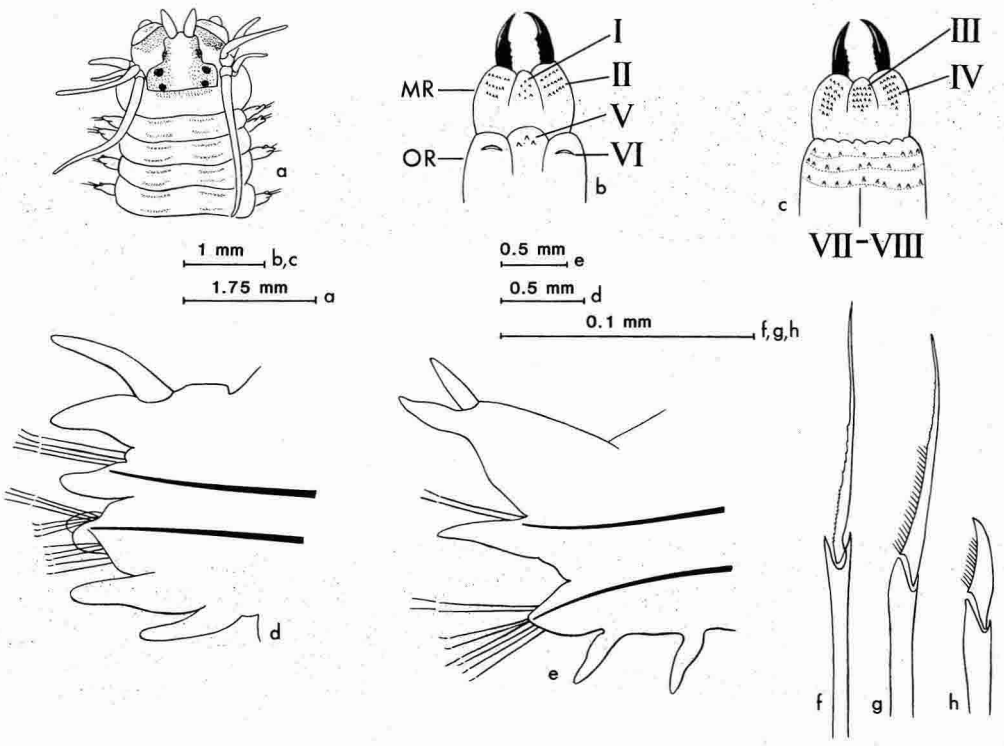

FIGURE 2. *Perinereis nigropunctata. a*, anterior end, dorsal view; *b*, pharynx, dorsal view, MR = maxillary ring, OR = oral ring, roman numerals denote areas (see text); *c*, pharynx, ventral view; *d*, anterior parapodium; *e*, posterior parapodium *f*, homogomph spiniger; *g*, heterogomph spiniger; *h*, heterogomph falciger.

similarly pigmented on the anterior margin. On the dorsum there are two transverse brown bars per segment, broken in the midline and fading toward the posterior region of the body.

HABITAT: In the intertidal region adjacent to Suva Harbor among the sabellariids on a shallow, muddy reef flat. (Two specimens collected on 22 June 1980, BPBM R1591.)

REMARKS: The specimens agree with the description in Day (1967), although the rudimentary fillet of the notopodia was not seen.

DISTRIBUTION: The species has a tropical Indo-West Pacific distribution (Bailey-Brock and Hartman 1985, Day 1967).

Platynereis sp.

Figure 3

Complete specimen with 54 segments measures 8.5 mm in length, 0.75 mm in width in the anterior region, and 0.5 mm in width in the posterior region (widths exclusive of parapodia). Incomplete specimen with 20 segments measures 4.2 mm in length, 0.8 mm in width anteriorly, and 0.5 mm in width posteriorly (exclusive of parapodia). The prostomium (Figure 3*a*) is broadly triangular with a pair of rounded palps and short antennae. There are two pairs of black eyes, the anterior slightly larger than the posterior. Peristomium with four pairs of peristomial cirri, the longest of which reaches to segments 8 and 9. The pharynx (Figure 3*b*, *c*) has bars of pectinate paragnaths on all areas except for I and V (Figure 2*b*, *c*, areas denoted by roman numerals). Jaws are translucent with golden tips and serrated edges; paragnaths are gray-brown and difficult to distinguish on these small specimens.

Parapodia are all biramous (Figure 3*d*, *e*). Notopodia and neuropodia are bilobed, and the dorsal cirrus is longer and more tapered than the ventral cirrus. Notosetae are com-

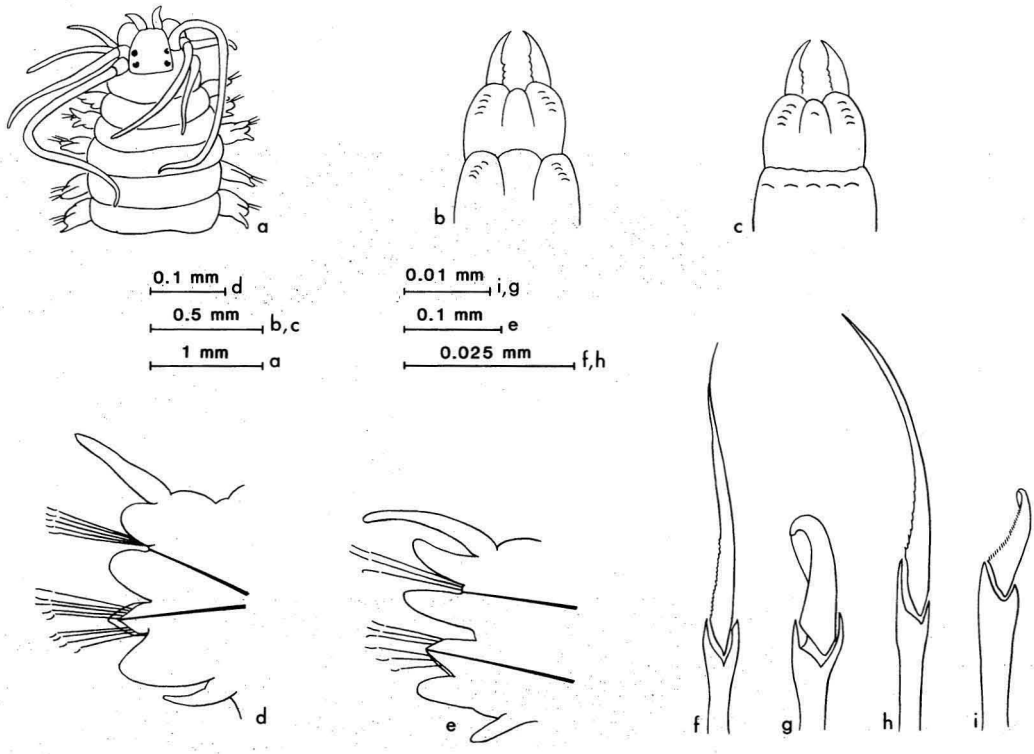

FIGURE 3. *Platynereis* sp. *a*, anterior end, dorsal view; *b*, pharynx, dorsal view; *c*, pharynx, ventral view; *d*, anterior parapodium; *e*, posterior parapodium; *f*, homogomph spiniger; *g*, homogomph compound falciger; *h*, heterogomph spiniger; *i*, heterogomph falciger.

pound homogomph spinigers (Figure 3*f*) and falcigers (Figure 3*g*) (some are fused as simple falcigers); neurosetae are compound homogomph and heterogomph spinigers (Figure 3*h*) and falcigers (Figure 3*i*). Acicula are black.

HABITAT: In the intertidal region adjacent to Suva Harbor among the sabellariids on a shallow, muddy reef flat. (Two specimens collected on 22 June 1980, BPBM R1602.)

REMARKS: The specimens are small and the diagnostic jaw formula is difficult to determine. Further studies and additional material are necessary before the specific characteristics can be defined.

Nereis (*Nereis*) sp.

Figure 4

Four specimens, two complete with 48 and 50 segments, 7.6 and 9.5 mm in length, 0.55 and 0.6 mm in width anteriorly, and 0.5 and 0.4 mm in width in the posterior region, respectively. Largest incomplete specimen with 39 segments measured 14 mm in length, 0.9 mm in width anteriorly, and 0.6 mm in width posteriorly (widths exclusive of parapodia).

Prostomium (Figure 4*a*) elongate, rounded anteriorly with a pair of short antennae and a pair of palps. Terminal articulation of palp clearly defined. Two pairs of black eyes, the anterior slightly larger than the posterior, which are partially hidden by the anterior margin of the peristomium. Brown pigmentation resembling a mask surrounds the eyes, and brown bars are present on the dorsum of the anterior region. Peristomium with four pairs of cirri, the longest of which extends to between segments 4 and 5 (three specimens) and to between segments 5 and 6 (fourth specimen). Jaws and paragnaths are brown. Paragnaths are all conical and arranged as follows

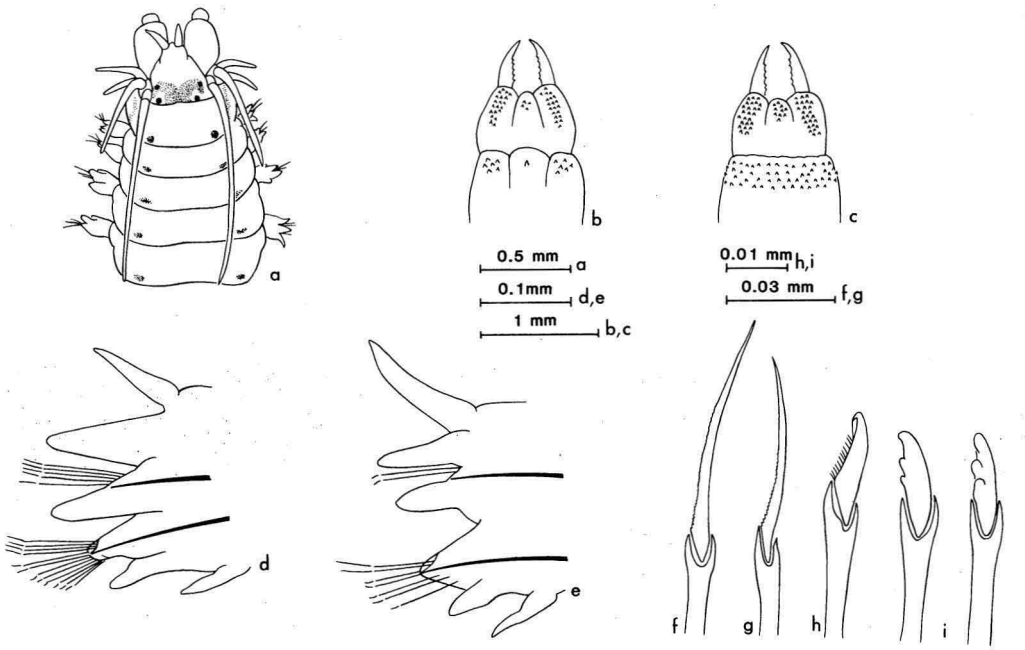

FIGURE 4. *Nereis* (*Nereis*) sp. *a*, anterior end, dorsal view; *b*, pharynx, dorsal view; *c*, pharynx, ventral view; *d*, anterior parapodium; *e*, posterior parapodium; *f*, homogomph compound spiniger; *g*, heterogomph compound spiniger; *h*, compound heterogomph falciger; *i*, bifid homogomph falciger of posterior notopodium, lateral and face views.

(Figure 4*b*, *c*): I = group of 4, II = about 20 in wedge, III = 10, IV = 25, V = 1, VI = group of 6, VII and VIII = numerous rows of cones.

Parapodia of segments 1 and 2 are uniramous, biramous thereafter. Notopodia with two ligules and tapered dorsal cirrus; neuropodia with acicular lobe and lower ligule and a short ventral cirrus (Figure 4*d*, *e*). Acicula are black with clear pointed tips. Notosetae of anterior and posterior parapodia are compound homogomph spinigers (Figure 4*f*) and heterogomph spinigers (Figure 4*g*); neuropodial heterogomph falcigers with curved blades and a tendon at the tip (Figure 4*h*). Posterior notopodia have two bifid homogomph falcigers (Figure 4*i*).

HABITAT: In the intertidal region near Suva Harbor among sabellariid tubes on a shallow, muddy reef flat. (Four specimens collected on 22 June 1980, BPBM R1603.)

REMARKS: The specimens resemble *Nereis persica* Fauvel in having similar notopodial falcigers in posterior segments.

FAMILY SPIONIDAE

Polydora kaneohe Ward, 1981

Specimens generally agree with the description of Ward (1981). The incised prostomium has a small occipital tentacle posterior to the second pair of eyes, near the bases of the palps. The caruncle extends to between setigers 3 and 4 as illustrated in Ward (1981). Setiger 1 has notopodial lobes but no setae; the neuropodium has winged capillaries. Setiger 5 with eight golden, heavy spines in a row, alternating with pale pennoned setae. Spines are simple, falcate, slightly pointed with a distal concavity and accessory tooth. Neuropodial hooded hooks start on setiger 7; they are bidentate with a narrow apical tooth separated from the main fang by a small gap. Posterior setigers with capillaries and short acicular setae. Pygidium cup-shaped with a dorsal notch. After preservation, the palps are marked with purplish-brown bands and the caruncle with an orange band.

REMARKS: Specimens differ slightly from

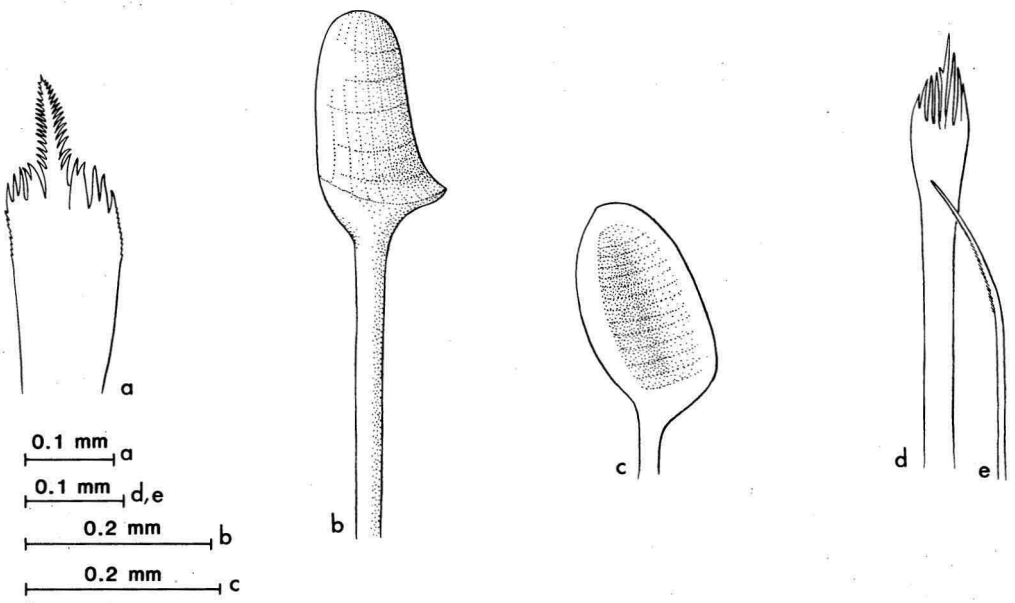

FIGURE 5. *Sabellaria* sp. *a*, outer opercular palea; *b*, middle palea; *c*, inner palea; *d*, oar-shaped seta of parathoracic segment; *e*, capillary seta of parathoracic segment.

the description in Ward (1981), as the heavy setae on setiger 5 are more pointed in the Fiji material than in the Hawaiian specimens, and the apical tooth of the neuropodial falcigers is narrower than illustrated (Ward 1981). There is a pair of small notopodial lobes on setiger 1 in the Fiji specimens.

HABITAT: In fine-grain mud tubes among the sabellariid tubes in Suva Harbor (Eight specimens, two as slides BPBM R2129.)

DISTRIBUTION: This species is known only from Kaneohe Bay, Oahu, Hawaii (Ward 1981).

Pseudopolydora antennata (Claparède 1870)

The first pair of eyes is more widely spaced than the second pair. The caruncle has a small occipital tentacle. The fifth setiger bears stout, spoon-shaped setae in a U-shaped fascicle. Neuropodial hooks start on setiger 8, each has a large main fang and a closely aligned small apical tooth. Setae of posterior setigers are simple capillaries.

HABITAT: In fine-grain mud tubes among the sabellariid tubes in Suva Harbor. (One specimen, BPBM R2130.)

DISTRIBUTION: This species has a cosmopolitan distribution that presently excludes the east Pacific and west Atlantic (Light 1978).

FAMILY SABELLARIIDAE

Sabellaria sp.

Figure 5

Worms form tubes of fine sand grains cemented together as in a honeycomb that encrusts the boulders. Tubes measure 2 mm in diameter. Specimens are 10–14 mm in length, excluding the anal tube. The paired opercular peduncles bear three rows of golden-brown paleae. Outer paleae (Figure 5*a*) are thin, flat, delicate, and pale golden in color, with six divided teeth on either side of a median barbed process. Middle paleae (Figure 5*b*) are tough, cup-shaped, geniculate, and golden brown in color. The inner paleae (Figure 5*c*) are very tough, thick, spoon-shaped, and dark brown in color. All three rows are readily visible. There are three parathoracic segments with oar-shaped setae (Figure 5*d*) and narrow capillary setae (Figure 5*e*). The branchiae have a smooth face and semicircular annuli on the other face, giving a finely pinnulated

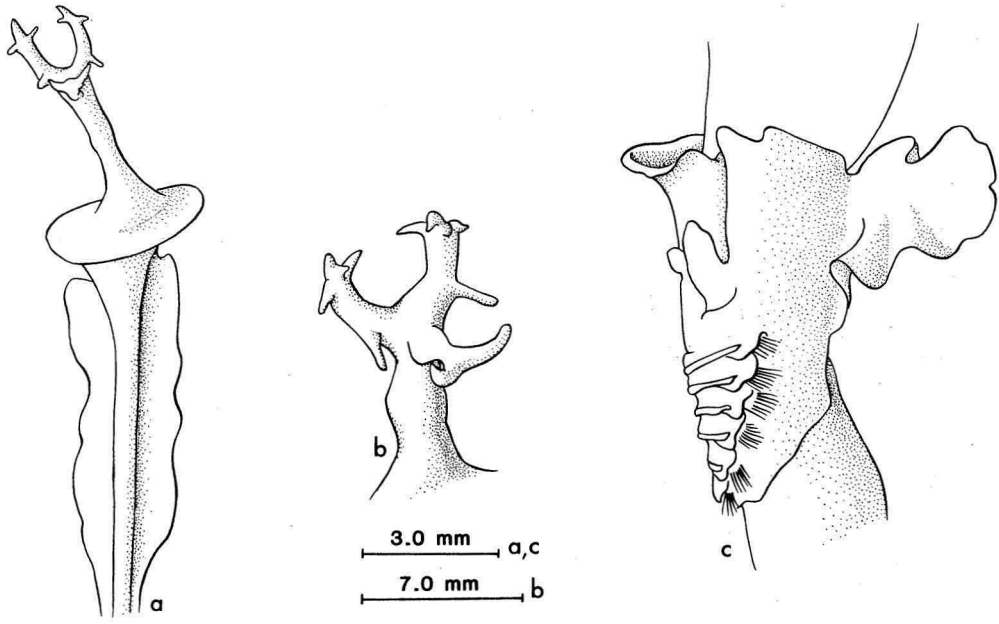

FIGURE 6. *Spirobranchus giganteus corniculatus*. *a*, operculum and peduncle; *b*, opercular spines; *c*, ventrolateral view of thorax and collar.

appearance. The opercular peduncles are speckled with black pigment (color after preservation).

HABITAT: In the intertidal region adjacent to Suva Harbor, forming encrusting masses on boulders in the muddy sand. (Numerous specimens collected on 22 June 1980, USNM 97447-8 and BPBM R2131.)

REMARKS: These specimens match the description of *Sabellaria spinulosa* Leuckart in Fauvel (1953). However, Leuckart (1849) cites Iceland as the type locality of this species, so it seems unlikely that the Fijian specimens are the same. There are a number of subspecies of *S. spinulosa,* but these specimens do not represent the subspecies *S. spinulosa alcocki* Gravier, as the middle paleae appear to be all the same length.

FAMILY SERPULIDAE

Spirobranchus giganteus corniculatus (Grube 1862)

Figure 6

A single specimen extracted from a living coral head (*Porites* sp.) lacks the tube. It measures 90 mm from the tip of the opercular spines to the posterior end of the abdomen, and 10 mm across the abdomen. The opercular plate (Figure 6*a*), 7 mm in diameter, has a central spine that divides into three branches 7 mm from the plate. Each of the three branches bears short spines. One of the branches has a bifurcate tip, the other two are closer together, each with a pair of lateral spines near the tip and a single lateral spine toward the origin (Figure 6*b*). The plate margin is deep pink, the rest pale pink (color after preservation). The opercular peduncle is somewhat flattened with lateral wings extending two-thirds the length of the peduncle. The lateral wings have entire edges and rounded distal tips (Figure 6*a*). The collar and thoracic membrane agree with the description by ten Hove (1970). There are tonguelets between the ventral and dorsolateral collar folds, and the thoracic membrane forms a ventral apron (Figure 6*c*). There are seven thoracic segments, six of which are uncinigerous. Collar setae penetrate the base of the collar, only two or three setae per fascicle.

HABITAT: From living coral (*Porites* sp.) on Northwest Reef at a depth of 20 mm in Bligh Water to the northwest of Viti Levu, Fiji. (One specimen collected on 21 June 1980, BPBM R2132.)

REMARKS: The Fijian specimen is distinctly larger than those recorded by ten Hove (1970), his largest measurement being 65 mm (removed from the tube). The structure of the thoracic and abdominal setae agree with the description by ten Hove (1970). The specimen is of the same type as *Spirobranchus gardineri* Pixell, 1913, which is considered a synonym of *S. giganteus corniculatus*. *Spirobranchus gardineri* was referred to *S. giganteus corniculatus* by ten Hove (1970), because the only difference between the opercula of both forms lies in the length of the common base of the three opercular spines. Examination of more specimens is desirable to establish whether the Fijian form, which resembles the *S. gardineri* material, is influenced by environmental or other factors.

DISTRIBUTION: *Spirobranchus giganteus corniculatus* (Grube, 1862) is known from the Indo-West Pacific region (ten Hove 1970).

Spirobranchus tetraceros (Schmarda 1861)

Figure 7

The tube (Figure 7*a*) is rounded in section, the mouth coils up on the previous whorl, and the tube was partially encrusted with a bryozoan (which was removed before preparing the figures). The diameter across the opening of the tube is 4–5 mm. A median ridge and four indistinct longitudinal ridges ornament the tube. Longitudinal ridges form lines of tiny perforations 4–5 mm behind the tube mouth; the mouth is damaged and the median tooth is missing. The tube is basically white but tinged with pale pink, which is especially marked along the median ridge. The radioles are shorter ventrally than dorsally and arranged in a ring. The branchial membrane (Figure 7*b*) extends one-third the length of the radioles; it lacks lobes but has a folded, pleated appearance when not extended. Radioles and opercular stalk are banded with blue. The opercular plate has six spines in three groups of two bearing thornlike lateral spines, but lacking a central spine (Figure 7*d*). The peduncle has lateral wings along the entire length, and the tips are finely divided adjacent to the opercular plate (Figure 7*c*). These opercular characters agree with the description of *Spirobranchus tetraceros* by ten Hove (1970), although the wings extend further down the peduncle in the Fijian specimen. The thorax (Figure 7*b*) is presumed to have seven segments, although the collar setae could not be found as described for some specimens of *S. giganteus giganteus* (ten Hove 1970). The thoracic membrane forms a ventral apron across the anterior segments of the abdomen. The collar is three-lobed, with two foliose dorsolateral lobes and a larger ventral lobe with a median point that is slightly longer than the distance to the base of the radioles. Tonguelets are present between the dorsolateral and ventral lobes. Thoracic notopodial fascicles are of approximately equal size, except for the seventh, which has about half the number of setae. Uncinigerous rows are shortest in the first thoracic uncinigerous segment, longest in the third and fourth, and slightly shorter in the sixth uncinigerous segment. Abdominal setae are trumpet-shaped, and the segments are full of eggs.

HABITAT: From Thakau Yavena reef in Bligh Water, approximately 18 km from shore off the northwest coast of Viti Levu, Fiji. (One specimen, BPBM R2133.)

REMARKS: This specimen agrees with the description by ten Hove (1970), except that the collar setae could not be examined and the tube mouth was damaged, so missing the median tooth. A copepod with egg sacs was attached near the base of a radiole and enclosed within the radiolar bundle.

DISTRIBUTION: This species has an Indian Ocean, Red Sea, Malaysian archipelago, Ponape, Majuro, Caribbean, Japan, and eastern Australian distribution (ten Hove 1970, Imajima 1982, Imajima and ten Hove 1984).

Spirobranchus tetraceros (Schmarda 1861)? variants

Figure 8

Two specimens were collected that show slight differences from each other in size, color

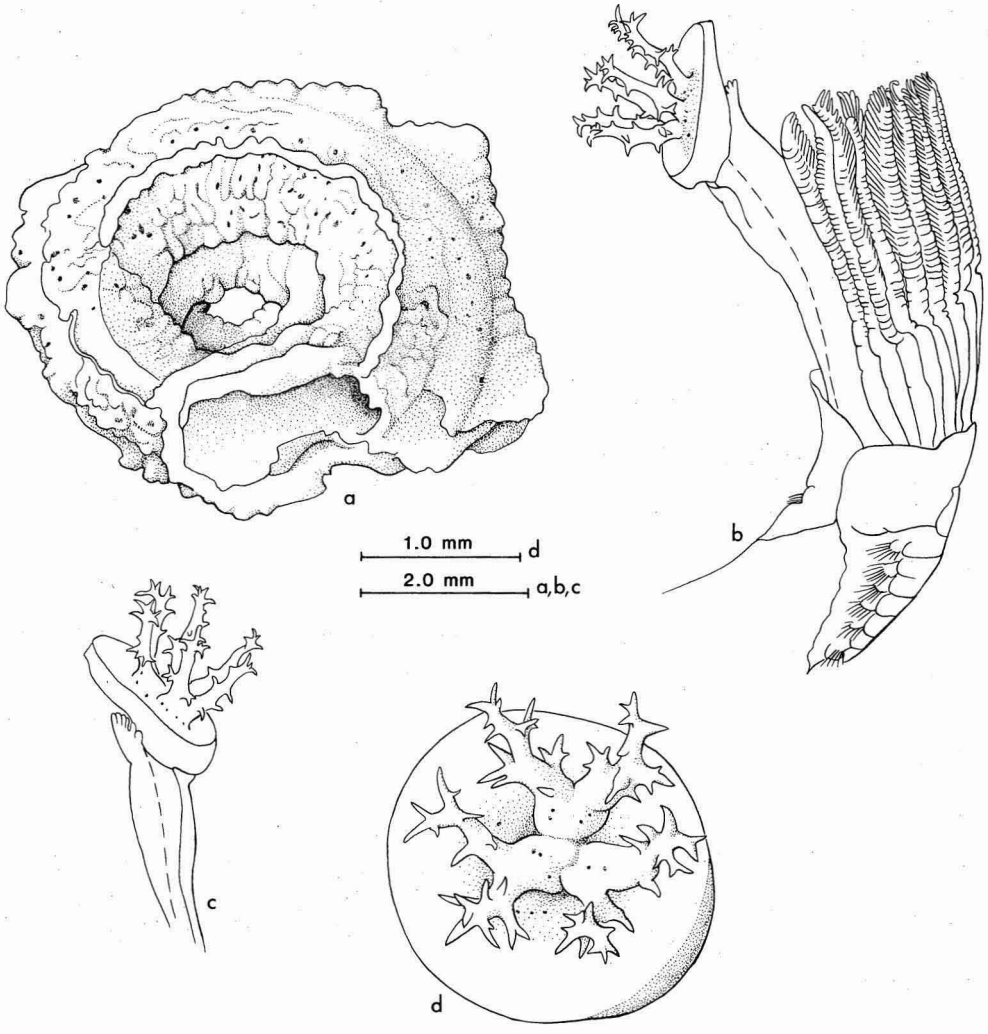

FIGURE 7. *Spirobranchus tetraceros*. *a*, tube; *b*, thorax with branchial membrane around the base of the radioles; *c*, opercular peduncle; *d*, opercular plate.

of tube, and radioles. The tube is triangular in section, with a strong median keel that is sinuous and forms a well-developed tooth over the mouth (Figure 8*a*, *b*). The surface of the tube is marked by small punctations, giving a foraminous appearance to the sides and lateral flanges. The tube of the larger specimen (the worm measures 20 mm in length) is salmon-pink with a faint rose tinge to the anterior portion of the median ridge (Figure 8*a*). The tube of the smaller specimen (worm measures 15 mm in length) is white at the oldest end (narrowest section of tube) with a vivid rose-pink median folded ridge (Figure 8*b*) and pink hue extending toward the mouth; it has indistinct longitudinal ridges and foramina, and the median tooth is damaged. The larger specimen has a thick, robust tube; the smaller is more fragile and less heavily calcified. The opercular plate measures 2–3 mm in diameter. It is flat in the larger specimen (Figure 8*c*) and slightly convex in the smaller one (Figure 8*d*), and bears a crown of eight spines with thornlike branches along their length. There is a single central spine that is much shorter than the peripheral ones, with five branches at the tip in the larger specimen (Figure 8*e*). The central spine is unbranched

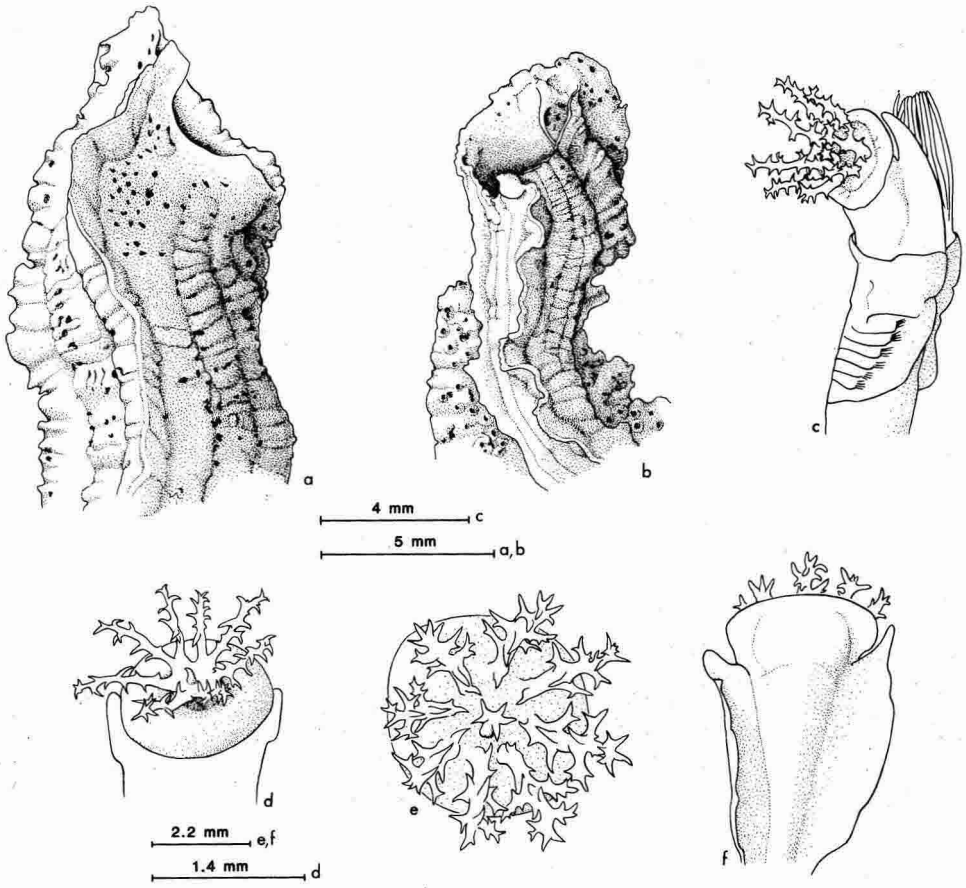

FIGURE 8. *Spirobranchus tetraceros* variants. a, tube of larger specimen; *b*, tube of smaller specimen; *c*, operculum and thorax of larger specimen; *d*, operculum of smaller specimen; *e*, opercular plate of larger specimen; *f*, opercular peduncle of larger specimen.

in the smaller specimen (Figure 8*d*). The opercular peduncle has lateral wings with pointed, entire tips (Figure 8*f*). The branchial membrane extends one-third the length of the radioles, with delicate webs between the radioles. The web folds as a pleat between each radiole and may project slightly at the junction of the free radioles and the branchial membrane. The radioles are shorter ventrally, longer dorsally, and arranged in a ring. They are pigmented with bright-blue bands, which are more intense in the larger specimen.

HABITAT: On coral rubble with bryozoans from Northwest Reef in Bligh Water, 19 km offshore from the northwest coast of Viti Levu, Fiji. (Two specimens, BPBM R2133.)

REMARKS: The characters of these specimens agree with those of the types of *Spirobranchus coronatus* Straughan, 1967 (ten Hove, personal communication) and with the description of *S. tetraceros* in ten Hove (1970), except for the following features: The peduncle of *S. tetraceros* has fringed wing tips, which were not evident in the Fijian specimens. The branchial membrane of *S. tetraceros* has bilobed processes between the radioles, which are lacking in the Fijian specimens. The operculum of *S. tetraceros* does not have a central spine, but this feature is present in the Fijian specimens. These specimens differ from *S. decoratus* Imajima, 1982 as the peduncular wings are entire, the eight spines are separate and not grouped in three groups,

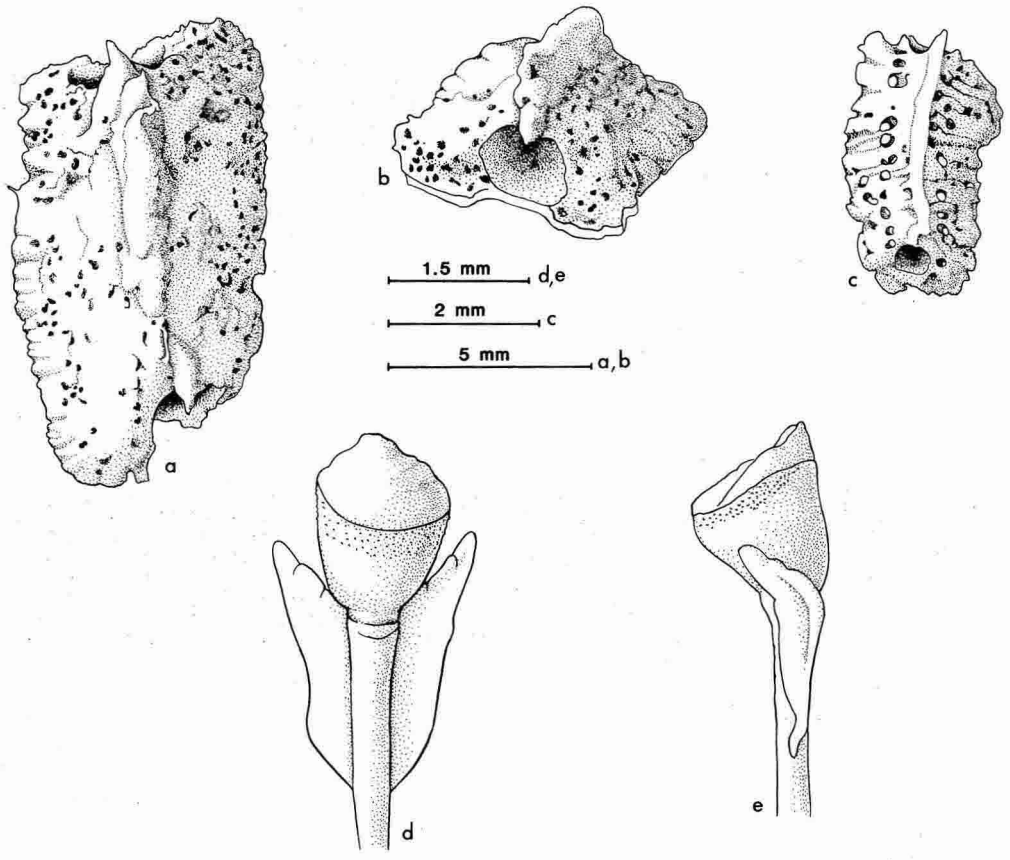

FIGURE 9. *Spirobranchus dennisdevaneyi* sp.n. *a*, anterior portion of tube; *b*, tube aperture; *c*, juvenile tube; *d*, *e*, opercula.

and there is a central spine. In view of these differences, these specimens are tentatively assigned to *S. tetraceros* as variants.

Spirobranchus dennisdevaneyi sp.n.

Figure 9

Six specimens, including two juveniles, can be assigned to this species. The tube is triangular in section and flattened against the substratum with broad lateral flanges (Figure 9*a*, *b*). The median keel projects as a tooth over the mouth in two specimens (Figure 9*a*), while another has a tooth on the keel behind the mouth. The tubes are white, with numerous foramina and small granular bumps on the lateral edges. The keel has a crest of fine undulations. Juvenile tubes have very broad lateral flanges perforated by pits and foramina, giving a lacey appearance (Figure 9*c*). Worms measured up to 12 mm in length when removed from their tubes and were pink. The operculum has a slanting calcareous plate, smooth with a raised edge in three specimens (Figure 9*d*, *e*), and an off-center ring of ten triangular spines in one. The juveniles have slightly flatter, unadorned calcareous plates. The distal part of the ampulla is marked with a band of tiny brown pointed papillae and is a deep rose-pink (Figure 9*d*, *e*). The plate is pale pink and the opercular peduncle has pale pink patches. The lateral wings of adult and juvenile peduncles are pointed, with the inner margins of the tips scalloped (Figure 9*d*, *e*), and extend almost to the base of the opercular stalk. Each group of approximately 25 radioles is joined by a branchial membrane that extends one-third their length. The

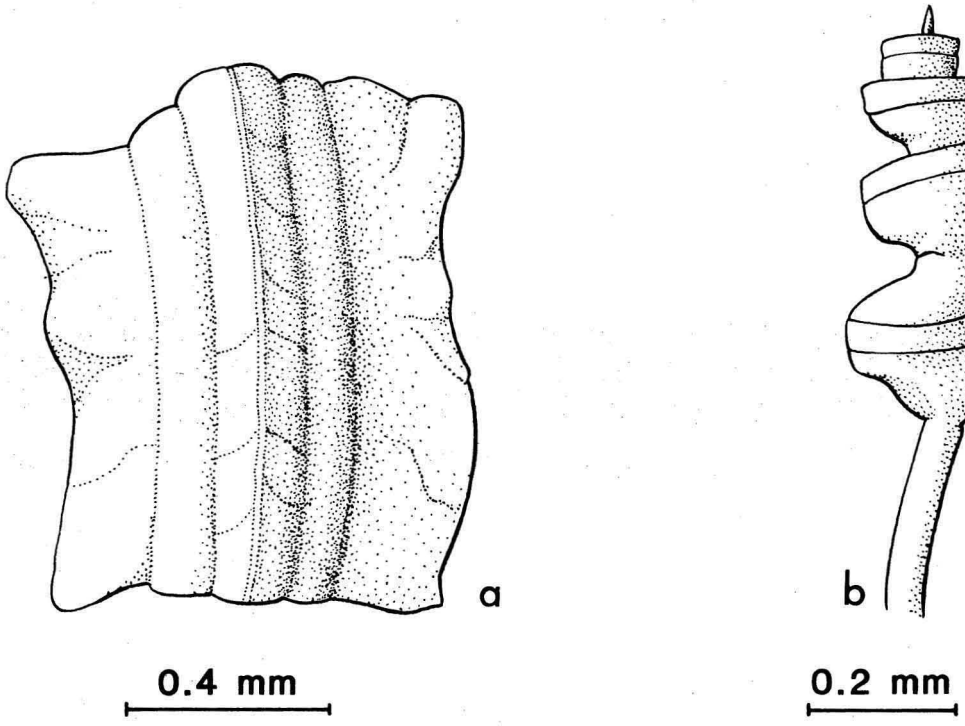

FIGURE 10. *Semivermilia pomatostegoides*. *a*, tube; *b*, operculum.

radioles have two pink horizontal bands and are not spirally arranged. The collar is half the length of the radioles, with tonguelets between the ventral and dorsolateral lobes. The thoracic membrane forms an apron on the ventral surface. The collar setae protrude through the thoracic membrane, are capillaries, and are the typical *Spirobranchus* type (ten Hove 1970). Thoracic uncini with 12–14 teeth; the most anterior is a "gouged" tooth. Abdominal uncini with 8–10 teeth including a gouged tooth.

HABITAT: On coral rock from Thakau Yavena reef, 18 km off the northwest coast of Viti Levu, Fiji. (Six specimens, BPBM R2134.)

REMARKS: These specimens agree with the descriptions of the nonspinous form of *Spirobranchus polycerus* (Schmarda 1861) var. *augeneri* ten Hove, 1970, as the operculum is reddish in color (more of a bright pink in the Fiji specimens). They differ, however, in the form and color of the tube, the presence of brown lens-shaped papillae on the ampulla just below the opercular plate, and the number and arrangement of radioles. The operculum of one specimen was encrusted with a bryozoan. The scalloped inner margin of the opercular wing tip could be an artifact of preservation or a stage in the formation of a divided tip. However, only entire tips have been described for this variety. Two additional specimens have been collected from Tonga (Bailey-Brock, manuscript in preparation).

The specimens are named for the late Dr. Dennis M. Devaney, Curator of Invertebrates at the Bernice P. Bishop Museum, Honolulu, who worked on coral reef invertebrates in the Hawaiian Islands and throughout the Indo-West Pacific region.

Semivermilia pomatostegoides (Zibrowius 1969)

Figure 10

A single specimen was scraped from a coral rock. The tube (Figure 10*a*) is triangular in section, with a keel on a well-defined median

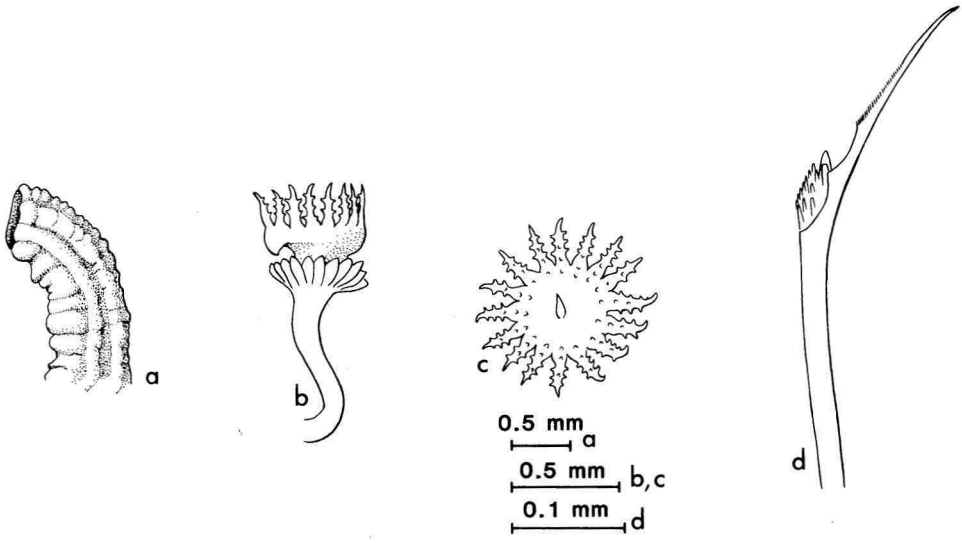

FIGURE 11. *Hydroides elegans*. *a*, tube; *b*, operculum; *c*, opercular crown; *d*, collar seta.

ridge, two lateral longitudinal ridges, and broad lateral flanges against the substrate. It is white and relatively smooth, except for the ridges and faint transverse growth lines. The operculum consists of an ampulla bearing four tiers, the most distal one with a short spine (Figure 10*b*). The tiers have a translucent chitinous appearance and are separated from each other except at the base. There is a slight swelling at the junction with the peduncle, which is round in section and lacks wings.

HABITAT: On coral rock from Thakau Yavena reef, 18 km off the northwest coast of Viti Levu, Fiji. (One specimen, BPBM R2135.)

REMARKS: This specimen resembles the description of *Pseudovermilia pacifica* by Imajima (1978). The opercular tiers, however, are separate from each other at the periphery in the Fijian specimen and more closely resemble the opercula of *Semivermilia pomatostegoides* collected from Hawaii (Bailey-Brock, manuscript in preparation). The tubes of Fijian and Hawaiian specimens appear to be identical.

DISTRIBUTION: This species was originally recorded from material dredged from a 23-m depth off Tripoli as *Vermiliopsis pomatostegoides* Zibrowius, 1969, and referred to *Semivermilia* by ten Hove (1975). It is known from the Sudanese Red Sea (Vine and Bailey-Brock 1984).

Hydroides elegans (Haswell 1883)

Figure 11

Two specimens were collected, measuring 4 mm in length when removed from the tube. The tube is white, sinuous, and brittle, with two blunt longitudinal ridges and numerous transverse striations (Figure 11*a*). The operculum is composed of a basal funnel with approximately 12–20 flutes having bluntly pointed, nonchitinized tips (Figure 11*b*). The distal crown (missing from one specimen) is composed of 16 peripheral spines and a single long smooth central spine (Figure 11*b*, *c*). Each peripheral spine has two (occasionally three) pairs of lateral spines and three small spines on the inner face. The fleshy opercular peduncle is not constricted where it joins the basal funnel (Figure 11*b*) and is rather flat. The collar setae are of two types: capillaries, and fin and blade setae with finely toothed blades. The fin (Figure 11*d*) has two large teeth, one more conspicuous than the other, and a number of very small teeth. There is a conspicuous smooth gap between the fin and the blade.

HABITAT: On coral rock from Northwest

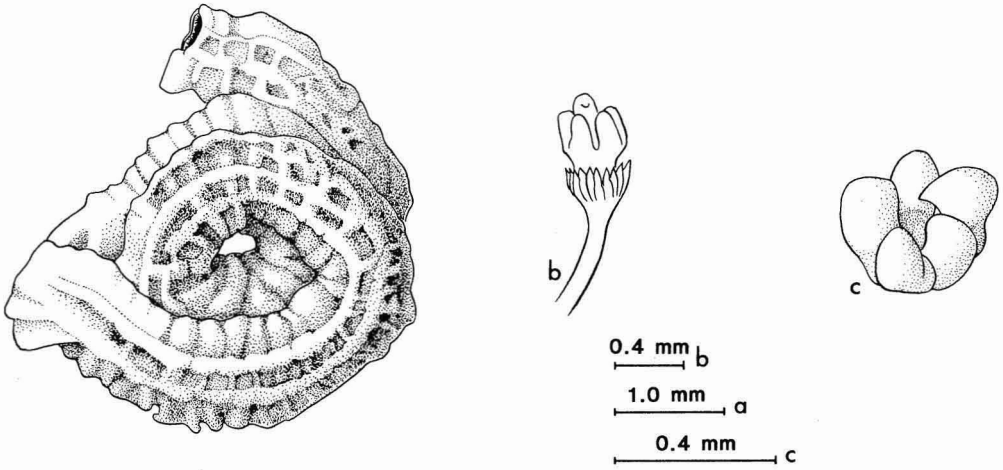

FIGURE 12. *Hydroides tuberculata. a*, tube, *b*, operculum; *c*, opercular crown.

Reef, 19 km off the northwest coast of Viti Levu in Bligh Water. (Two specimens, BPBM R2136.)

REMARKS: These specimens resemble the description in Zibrowius (1971: 721, Figs. 59, 60, 64), where the opercular spines have two pairs of lateral spines and three or four short spines on the inner face. However, the central spine is longer and more slender than the one illustrated in Zibrowius' fig. 63, and the basal flutes are slightly more pointed in one of the Fijian specimens. The collar setae resemble Zibrowius' fig. 56.

DISTRIBUTION: *Hydroides elegans* is a common fouling species with a cosmopolitan distribution in warm waters of the Atlantic, Pacific, and Indian oceans (see Zibrowius 1971: 717–720 for synonomies).

Hydroides tuberculata Imajima, 1976

Figure 12

Eight specimens were collected, measuring 6–13 mm in length when removed from the tubes. Tubes are irregularly sinuous, often coiling up on or passing over previous whorls. There are two or three indistinct rounded longitudinal ridges and many transverse striations (Figure 12*a*). Tubes are brittle, white with a thin dark-brown lining sometimes showing through and giving them a discolored or bluish appearance. The opercular funnel has 20–25 pointed radii that curve outward slightly, with brown tips (Figure 12*b*). The crown is composed of five petaloid valves covered with a thin chitinous layer and joined at their bases by folds. One valve is larger than the others and has a pointed curved tip that projects into the middle of the crown (Figure 12*b*, *c*). Valves are rounded in cross section, and each has a blunt swelling distally that is most conspicuous in lateral view. The thorax is dark brown, and there is a brown spot at the junction of the peduncle and operculum. The abdomen is creamy yellow, and eggs were present in some of the specimens. (Colors after preservation.)

HABITAT: From coral rubble on Northwest Reef and Thakau Yavena reef, 19 km and 18 km, respectively, off the coast of Viti Levu, Fiji, in Bligh Water. (Eight specimens, BPBM R2137.)

REMARKS: The petaloid shape of the opercular valves distinguishes it from the description of *Hydroides brachyacantha* by Dew (1959:28), which has a curved spiny projection on each of the crown elements, and from that of *H. perezi* Fauvel, 1918, which has valves that are flat in cross section. The Fijian specimens match with Imajima's (1976:132) original description.

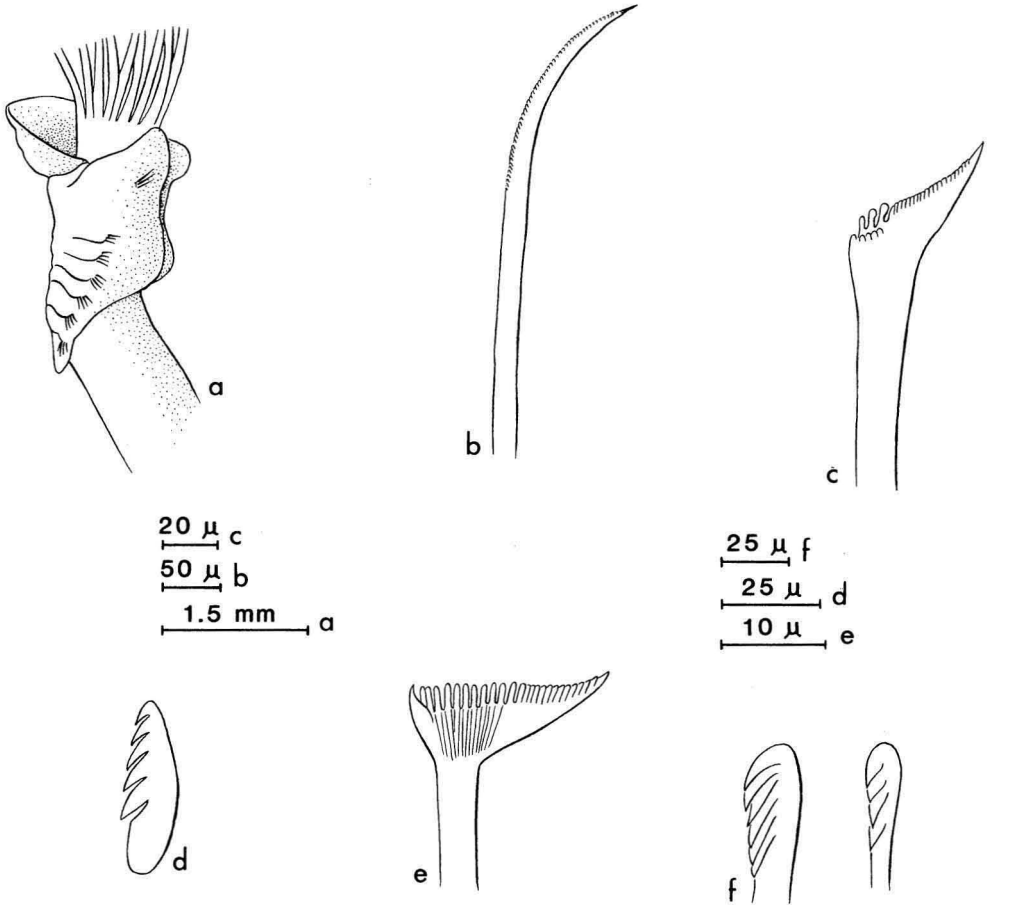

FIGURE 13. *Floriprotis sabiuraensis*. *a*, ventrolateral view of thorax; *b*, capillary collar seta; *c*, blade collar seta; *d*, thoracic uncinus; *e*, abdominal seta; *f*, abdominal uncini.

DISTRIBUTION: Japan, North Queensland, Australia, Ponape, Truk, and Palau islands (Imajima and ten Hove 1984).

Floriprotis sabiuraensis Uchida, 1978

Figure 13

Three specimens measuring 20 mm in length were removed from a piece of living scleractinian coral. The tube, which was buried in the coral, is opaque white and smooth on the inner surface. The radioles have very long slender tips, are not united by a well-developed branchial membrane, and are of unequal length, shorter dorsally and longer ventrally. There is no operculum. The collar is three-lobed, with two dorsolateral lobes and large ventral lobe extending at least one-third to one-half the length of the ventral radioles (Figure 13*a*). The thoracic membrane wraps around all thoracic segments, but is most developed near the third unciniger (Figure 13*a*). There are pockets on the inner side of the thoracic membrane, and one specimen contained eggs in the pockets with a few eggs under the overlapping flaps. Collar setae are of two types: capillary (Figure 13*b*) and blade setae (Figure 13*c*). The blades are finely serrated along their length, except for a toothed basal portion that has three large rounded teeth and a number of smaller ones (Figure 13*c*). The collar fascicle contains more than ten setae, with more blades than capillaries. Notosetae of the following thoracic segments

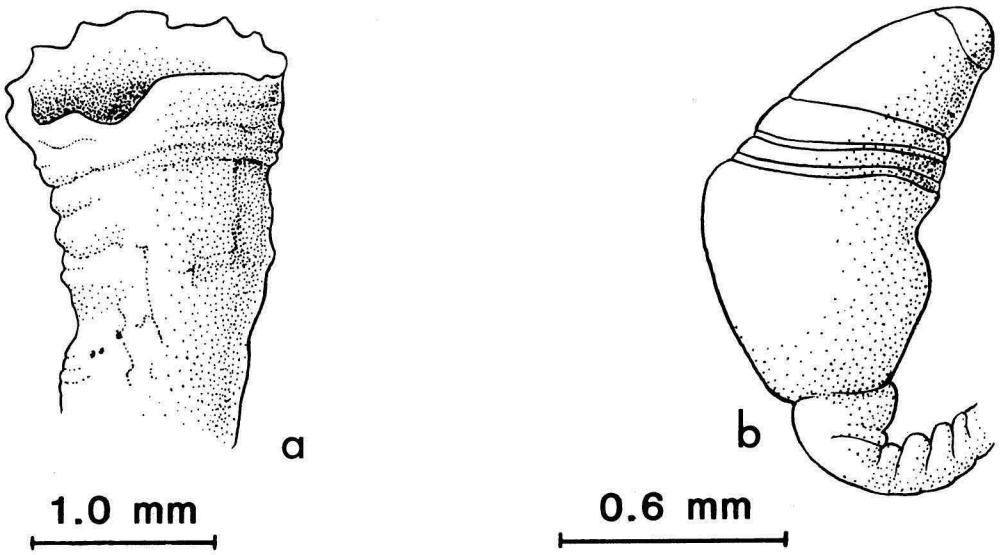

FIGURE 14. *Vermiliopsis glandigerus*. *a*, tube; *b*, operculum.

are arranged in two rows in each fascicle. Thoracic uncini have five curved teeth along the edge and a rounded basal lobe (Figure 13*d*). Abdominal setae are geniculate, with a marked tooth above the shaft on the edge with rounded teeth (Figure 13*e*). Abdominal uncini have four teeth in anterior abdominal segments; those from posterior setigers are smaller and have about eight teeth (Figure 13*f*). There are seven thoracic segments and 108–128 abdominal segments. The worms are creamy white (color after preservation).

HABITAT: Associated with living scleractinian corals from Northwest Reef in Bligh Water off the northwest coast of Viti Levu, Fiji. (Three specimens, BPBM R2138.)

REMARKS: These specimens agree with Uchida's (1978:18) description, except that they lack warts on the collar and the orange tone of the Japanese specimens. However, these features may be lost or inconspicuous after preservation (Uchida, personal communication). There may be fewer collar setae than Uchida indicated (25–35 blades and 10–15 capillaries). Actual counts were not made to avoid damaging the specimens.

DISTRIBUTION: Sabiura, Japan, in living coral, *Goniastrea pectinata* (from depths of 3–20 m, and in *Favia speciosa* and *Favites abdita* (Uchida 1978; personal communication).

Vermiliopsis glandigerus Gravier, 1906

Figure 14

Sinuous white tube with five or more longitudinal ridges that are not markedly developed and with transverse striations (Figure 14*a*). The operculum is composed of a fleshy ampulla and a conical, golden-brown chitinous cap, divided into four layers by partitions, the more distal the largest (Figure 14*b*). The peduncle is round in section, wrinkled, and swollen at the base of the ampulla.

HABITAT: On coral rock from a depth of 3 m on Northwest Reef in Bligh Water, 19 km northwest of Viti Levu, Fiji. (One specimen, BPBM R2139.)

REMARKS: *Vermiliopsis glandigerus* is a form with variable opercular features. Ten Hove (1975) suggested placing a number of these polymorphic species into a catchall group called the "*V. infundibulum*/*glandigera*" complex.

DISTRIBUTION: Cosmopolitan in warm seas; in the west Pacific this taxon is known from the Truk Islands as *V. infundibulum*/*glandigera*

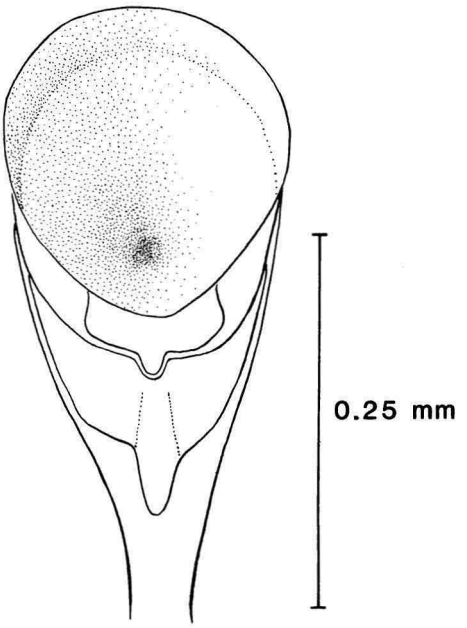

FIGURE 15. *Vinearia koehleri* operculum.

(Imajima and ten Hove 1984); and from the Marshall Islands (Reish 1968), the Solomons (Gibbs 1971), and New Caledonia (Rullier 1972) as *V. glandigerus*.

FAMILY SPIRORBIDAE

Most spirorbids were found attached to coral rock at a depth of 3 m on Northwest Reef in Bligh Water, 19 km northwest of Viti Levu, Fiji. *Neodexiospira foraminosa* and *Janua pagenstecheri* were collected on Thakau Yavena reef, and *Eulaeospira orientalis* was also collected from Northwest Reef and in the intertidal region near Suva Harbor, attached to a sabellariid tube.

Vinearia koehleri (Caullery and Mesnil 1897)

Figure 15

The tube is sinistral, white, and longitudinally ridged. The operculum is comprised of multistacked opercular plates forming the roof and walls of a calcareous brood chamber (Figure 15).

REMARKS: These specimens have features that agree with descriptions by Vine (1972*b*, 1977) and Vine, Bailey-Brock, and Straughan (1972) as *Pileolaria koehleri*. P. Knight-Jones revised the genus (Knight-Jones 1984). (Six specimens, BPBM R2140.)

DISTRIBUTION: The Mediterranean, Red Sea, Australia, New Zealand (Vine 1972*b*, 1977; Vine, Bailey-Brock, and Straughan 1972), and the Hawaiian faunal area (Bailey-Brock 1976).

Pileolaria militaris (Claparède 1868)

Figure 16

The tube is sinistral, white, massive, measuring 4 mm in diameter, with transverse growth lines. Juvenile and adult stages were present. The plate of the juvenile has a large peripheral talon with lateral processes and a spine (Figure 16*a*). The opercular plate of the mature adult is the helmet-shaped brood chamber covered with short spines, with a peripheral rim bearing short spines. The sides of the chamber have spines arranged in rows on the face adjacent to the opercular peduncle (Figure 16*b*) and on the opposite face (Figure 16*c*). There is a mass of dark-brown material in the anterior part of the thorax, which is typical for this species.

REMARKS: These specimens agree with material from the Hawaiian Islands and Australia, except for the sharp spine on the juvenile plate and the very spiny appearance of the adult chamber. They closely resemble the Mediterranean form described by Zibrowius (1968). (Three specimens, BPBM R2141.)

DISTRIBUTION: Worldwide distribution in warm waters and tropical region (Vine, Bailey-Brock, and Straughan 1972).

Eulaeospira orientalis (Pillai 1960)

Figure 17

The tube is sinistral, white, usually with a low longitudinal median ridge and faint transverse striations (Figure 17*a*); it measures 1 mm or less in diameter. It is flatly coiled, except in some specimens when the last whorl coils

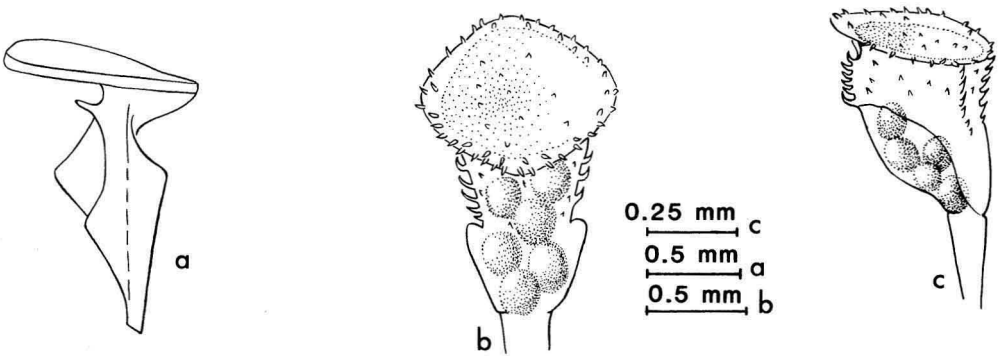

FIGURE 16. *Pileolaria militaris*. *a*, opercular plate of juvenile specimen; *b*, opercular chamber of mature specimen, face view; *c*, same, lateral view.

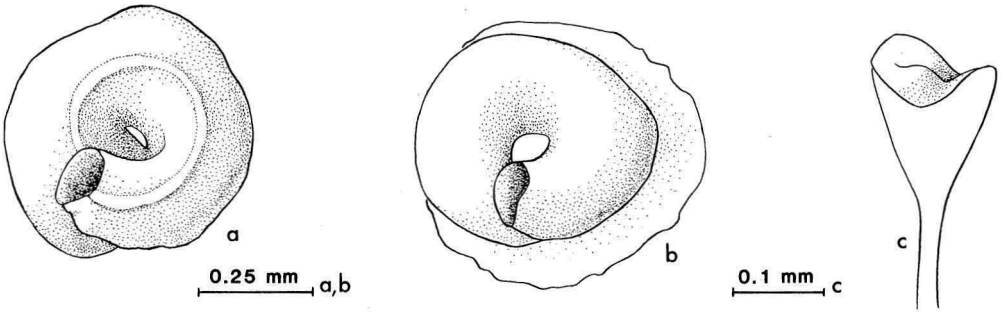

FIGURE 17. *Eulaeospira orientalis*. *a*, tube with median ridge; *b*, smooth tube; *c*, operculum.

up on previous whorls and appears smooth except for faint transverse striations (Figure 17*b*). There is a broad lateral flange where the tube joins the substratum (Figure 17*b*). The operculum has a slightly concave to convex opercular plate (Figure 17*c*) with an asymmetrical depression or a thin flat plate (Knight-Jones, Knight-Jones, and Llewellyn 1974: 119, fig. 7p). The peduncle is longer than the radioles. Collar setae are mostly fin and blades; some specimens show little separation between fin and blade (Pillai 1960: fig. 14f), others a larger gap; simple blades. The anterior end of thoracic and abdominal uncini are peglike when viewed laterally (Pillai 1960: fig. 14h) and may have three teeth when viewed dorsally, but these structures were difficult to see clearly.

REMARKS: One of the specimens was incubating embryos in the tube, in a mass at the posterior end of the fecal groove. These specimens are tentatively assigned to *Eulaeospira orientalis* although they show some characters in common with *E. convexis* Wisely. They have the flat opercular plate, long peduncle, and median ridge on some of the tubes characteristic of *E. orientalis*. However, some specimens have smooth tubes and asymmetrical opercular plates typical of *E. convexis* (Knight-Jones, Knight Jones, and Llewellyn 1974). There may well be a cline between these two species (E. W. and P. Knight-Jones, personal communication). (Fifteen specimens, BPBM R2142.)

DISTRIBUTION: This species is known from the Red Sea, Ceylon, Madagascar, and Hawaii (Vine 1972*b*, Vine and Bailey-Brock 1984).

Neodexiospira foraminosa (Moore and Bush 1904)

Figure 18

The tubes are dextral with well-defined

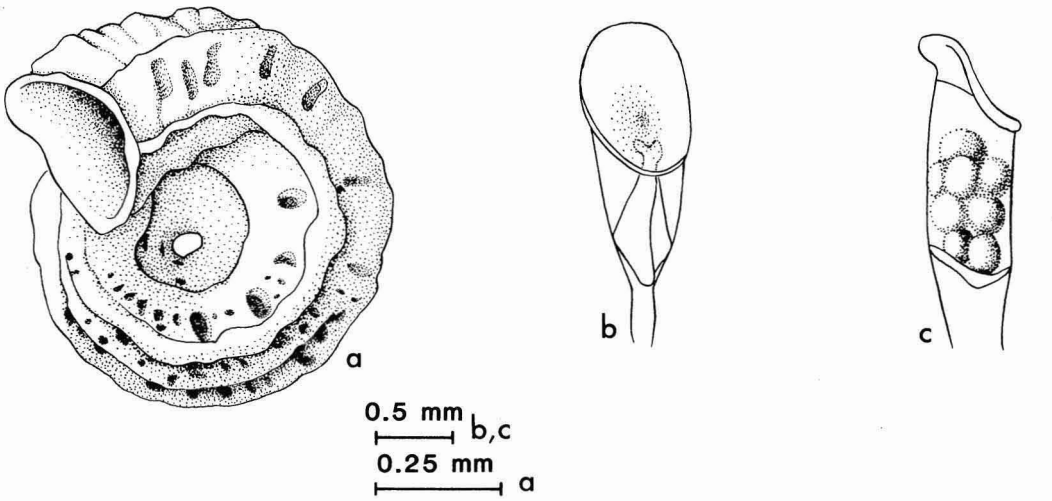

FIGURE 18. *Neodexiospira foraminosa*. *a*, tube; *b*, primary brood chamber; *c*, brood chamber of adult individual.

longitudinal ridges and transverse grooves and ridges, giving the characteristic foraminous appearance (Figure 18*a*). The opercula have flat calcareous plates with a lateral rim and a long flattened bifid talon on one side (Figure 18*b*). The talon of a juvenile specimen extended well into the opercular stalk. The talon forms the wall of the primary brood chamber, which is lightly calcified (Figure 18*c*). Collar setae are simple, with those of the convex side of the thorax striated and those of the concave side not striated.

REMARKS: This species is distinct from *Neodexiospira steueri* var. *heideri* (Sterzinger), a Red Sea and Australian species with which it has been confused (Vine and Bailey-Brock 1984:148). (Nine specimens, BPBM R2143.)

DISTRIBUTION: The Pacific, including the Hawaiian Islands (Vine, Bailey-Brock, and Straughan 1972) and Johnston Atoll (Bailey-Brock 1976) as *Janua steueri*; and the Red Sea (Vine and Bailey-Brock 1984) as *J. foraminosa*.

Neodexiospira preacuta (Vine 1972*b*)

Figure 19

The tube is dextral, white, with three clearly defined, raised longitudinal ridges extending as two or three teeth over the mouth, with transverse growth lines between the ridges and a flared wavy edge where the tube joins the substratum. The opercular plate is convex with an asymmetrical peglike talon that extends into the top of the peduncle and ends in an arrowlike tip (Figure 19*a*, *b*). The walls of the brood chamber are lightly calcified and end before the tip of the talon, which is missing in subsequent brood chambers. Collar setae are simple, with those of the convex side of the thorax striated and those of the concave side of the thorax not striated.

REMARKS: The material matches specimens from Hawaii identified as *Janua turrita* (Vine 1972*a*) and from the Red Sea (Vine 1972*b*). See Knight-Jones, Knight-Jones, and Kawahara (1975:113). (Eleven specimens, BPBM R2144.)

DISTRIBUTION: The Hawaiian Islands (Vine 1972*a*) and the Red Sea (Vine 1972*b*).

Janua pagenstecheri (Quatrefages 1865)

The tube is dextral, with three clearly defined longitudinal ridges and a median tooth over the mouth. The operculum is a thin-walled chamber with a flat plate bearing a peripheral peglike talon. One specimen has two chambers; the distal is filled with developing embryos, but the talon is still visible; the proximal chamber is empty. The plate separating the two chambers (forms the roof of the proximal chamber) also has a talon. The

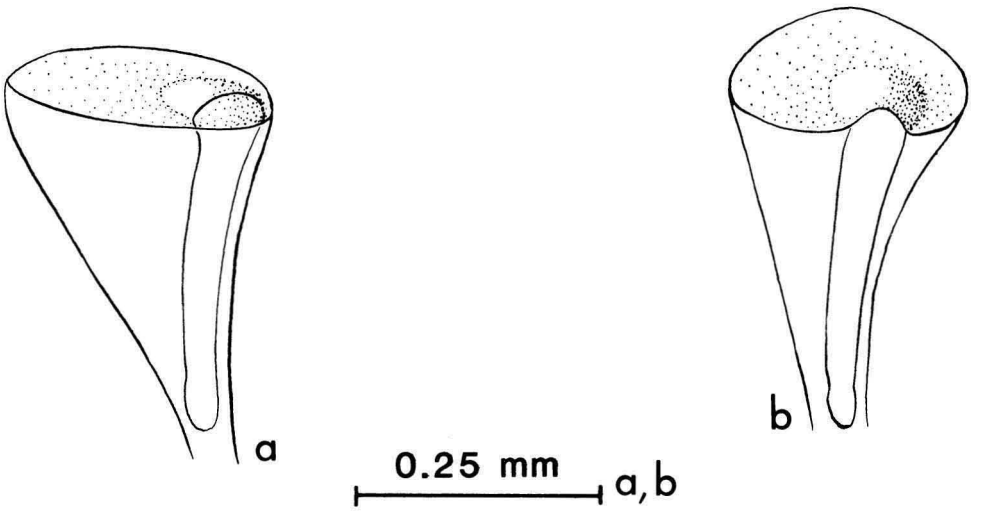

FIGURE 19. *Neodexiospira preacuta*. *a*, *b*, two views of operculum.

second specimen has a single chamber with plate and talon and did not contain embryos.

REMARKS: These specimens are tentatively assigned to this species, although the presence of two opercular plates with talons is unusual and has only been mentioned once before (Zibrowius 1968). The subsequent opercular plates normally lack the talon. The opercular features of these specimens resemble *Leodora knightjonesi*, a sinistral species that typically bears two or three brood chambers stacked one above the other, each with an opercular plate and peg talon.

DISTRIBUTION: *Janua pagenstecheri* is a cosmopolitan species with a Pacific distribution that includes the Tuamotu, Galapagos, and Hawaiian islands and east Australia (Knight-Jones, Knight-Jones, and Llewellyn 1974). (Two specimens, BPBM R2145.)

DISCUSSION

Among the 7 families and 23 species represented in this Fijian collection, the serpulids (8 species) and spirorbids (6 species) are most numerous and consequently provide the most information on the zoogeographical affinities of Fijian polychaetes. The live-coral-dwelling serpulid *Floriprotis sabiuraensis* has been recorded previously only from Sabiura Island in subtropical Japan (Uchida 1978). The only other serpulids invading live corals, *Spirobranchus giganteus* (subspecies *giganteus* and *corniculatus*), are widely dispersed in tropical Atlantic, Pacific, and Indian oceans. The serpulids have been recorded from the Red Sea, Gulf of Elat, Indo-West Pacific, and Caribbean.

The 6 spirorbids have a distribution that encompasses the Mediterranean, Red Sea, Indo-West Pacific to Hawaii, and Caribbean. *Janua pagenstecheri* has a cosmopolitan distribution that includes the east Pacific region (Vine, Bailey-Brock, and Straughan 1972).

The 2 polynoids are known from the Indo-West Pacific region and Red Sea, but have not been recorded from Hawaii. Of the spionids, *Polydora kaneohe* was known previously from Hawaii, and the cosmopolitan species *Pseudopolydora antennata* is known from the Hawaiian, Marshall, and Solomon islands (Ward 1981).

None of the 19 polychaete species identified to species are known from the Cook Islands (Gibbs 1972), only 2 from Tahiti and the Marquesas (Table 2), and 4 from New Caledonia (Fauvel 1947, Rullier 1972). The polychaete faunas of Australia and Japan both have 10

TABLE 2

RECORDED DISTRIBUTION OF POLYCHAETES FROM FIJI AND OTHER PACIFIC LOCATIONS

Species	JAPAN	AUSTRALIA	SOLOMONS	NEW CALEDONIA	TONGA*	TAHITI, TUAMOTUS, MARQUESAS	HAWAII
Lepidonotus carinulatus	+	+	−	+	−	−	−
L. elongatus	+	−	−	−	−	−	−
Perinereis nigropunctata	−?	+	+	+	−	−?	+
Polydora kaneohe	−	−	−	−	−	−	+
Pseudopolydora antennata	+	−	+	−	−	−	+
Spirobranchus giganteus corn.	+	−	+	+	+	+	+
S. tetraceros	+	+†	+†	−	−	−	−
S. dennisdevaneyi	−	−	−	−	+	−	−
Semivermilia pomatostegoides	−	−	−	−	−	−	+
Hydroides elegans	+	+	−	−	−	−	+
H. tuberculata	+	+	−	−	+	−	−
Floriprotis sabiuraensis	+	−	−	−	−	−	−
Vermiliopsis glandigerus	+	+	+	+	+	−	+
Vinearia koehleri	−	+	−	−	+	−	+
Pileolaria militaris	−	+	−	−	−	−	+
Eulaeospira orientalis	−	+	−	−	+	−	+
Neodexiospira foraminosa	+	−	−	−	+	−	+
N. preacuta	−	−	−	−	+	−	+
Janua pagenstecheri	−	+	−	−	+	+	+

* Bailey-Brock (in preparation).
† As *Spirobranchus coutierei* (Gravier).

species in common with those found in Fiji, Tonga has 9 species (Bailey-Brock, unpublished), and the Solomon Islands have 5 species (Table 2). Reviews of the zoogeographical affinities of polychaetes from these west Pacific regions are presented by Uchida (1978), Imajima and ten Hove (1984), and Knight-Jones, Knight-Jones, and Llewellyn (1974). There are 13 species in common with Hawaii (Bailey-Brock and Hartman 1985, Imajima and ten Hove 1984), which is considered to be at the eastern extent of the Indo-West Pacific region.

Although the number of species from Fiji is relatively few, there appears to be a relationship between the coral-dwelling polychaete faunas of Hawaii, Japan, eastern Australia, Tonga, and Fiji (see Table 2). The polychaetes of New Caledonia and the Solomons show less similarity with Fiji, with only 4 and 5 species in common, respectively, despite the closer proximity of these island groups. This discrepancy may be accounted for by lack of sampling. The Cooks, Tuamotus, Societies, and Marquesas in the eastern part of the Indo-West Pacific have fewest species in common with Fiji. This trend from west to east in the southern Pacific may be explained on the basis of sampling effort. However, it does reflect Ekman's rule (Ekman 1953) that species richness diminishes with increasing distance from the center of the Indo-Pacific region. Other explanations for the relationship of polychaete faunas in the southern hemisphere may be related to plate movements and the location of deep trenches, e.g., the Tonga–Kermadec trench to the east of Fiji. The Societies, Marquesas, and Tuamotus are now thought to have more faunal similarities with Hawaii (Kay 1984), and are the most distant island groups from Fiji. Larval dispersal of Indo-West Pacific species would depend on length of larval life and the vagaries of surface current systems in transporting larvae to the southeast Pacific region to explain Ekman's rule. More plausible reasons to explain the recorded composition of polychaete faunas in the south Pacific are the lack of taxonomic

and ecological studies of polychaetes from these remote Pacific locations.

ACKNOWLEDGMENTS

I am most grateful to M. H. Pettibone and L. A. Ward, U.S. National Museum, Smithsonian Institution, for identifying the polynoids and spionids and for assisting with descriptive notes on these species. T. Perkins, Florida Department of Natural Resources, kindly identified the nereids. H. ten Hove, Zoologisch Laboratorium, Utrecht, M. Imajima, National Science Museum, Tokyo, and H. Uchida, Sabiura Research Station, Kushimoto, reviewed the manuscript and advised on the serpulids. E. W. and P. Knight-Jones verified the spirorbid identifications. R. E. Brock collected the specimens and provided habitat and station information under the International Sea Grant Program. Illustrations were prepared by Sue Monden and printed with funds from the International Sea Grant Program, grant NA79AA-D-00112 to Dr. P. Helfrich, Director, Hawaii Institute of Marine Biology.

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